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THE JAPANESE SPECIES OF BLANFORDIA.

BY HENRY A. PILSBRY.

I have recently received a series of Blanfordias, representing a new species, from Prof. Seitaro Goto of the Zoological Institute of the Science College, Imperial University of Tokyo. Professor Goto writes as follows: "I am interested in these snails as the intermediate hosts of the Japanese blood fluke, whose life-history a former student of mine has succeeded in making out. He has already published a short preliminary paper on the subject and I hope that he may be able to quote your authority in his full paper in regard to the specific identity of the snails. The locality of these specimens is Sakai, Saga Prefecture (Kyushu)."

Blanfordia nosophora (Robson).

The shell is perforate, turrited, solid, of a russet color, the worn summit pink or dark vinaceous. The surface is glossy, faintly marked with growth-striæ. The early whorls are wanting in the adult stage, 5 to 7 whorls remaining. These are strongly convex, united by a deep suture. The last whorl swells out to form a rounded ridge or varix behind the peristome. The aperture is vertical, ovate, somewhat diagonal; deep within it is of a vinaceous color, then yellowish in a band under the varix, finally olive at the edge of the lip. The peristome expands and is narrowly recurved at the edge, and a transparent callus connects the outer and inner margins.

Length 7.2, greatest diam. 3 mm. (old specimen, 5½ whorls remaining).

Length 8.2, greatest diam. 3 mm. (less eroded specimen, 7⅓ whorls remaining).

Length 6.6, greatest diam. 2.6 mm. (younger specimen, 6½ whorls remaining).

This species is related to *Blanfordia japonica* A. Adams, of Sado Island, both having a well-developed varix behind the lip; but the Sado shell has a higher varix, and a much more rapidly tapering spire, the later whorls much wider. A specimen of *B. japonica* 7.3 mm. long is 4.3 mm. in greatest diameter. It is usually larger, about 8 mm. long, after having lost a whorl or two at the tip in the adult stage.

Blanfordia is probably distributed over the whole of the main island of Japan, Sado, Kyushu and southern Yesso. The following species are known to me by many specimens of all of them sent by Mr. Y. Hirase and also from other sources:

a. Outer lip of the shell strengthened by a rounded varix.

b. Shell slender, slowly tapering, the greatest diameter less than half the length. *B. nosophora* (Robson) Kyushu.

bb. Shell stout, conic, the greatest diameter more than half the length. *B. japonica* (A. Ad., 1861) Sado.

aa. Outer lip of shell without any external varix.

b. Larger, the length 8 or 9 mm. *B. bensoni* (A. Ad., 1861) Hokkaido.

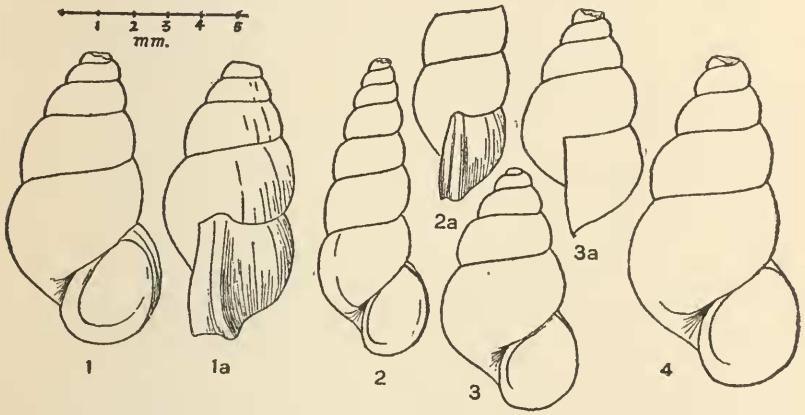
bb. Smaller, the length 6 to 6.5 mm. *B. simplex* Pils., 1902, Uzen, etc.

I have a smaller form than *B. simplex*, with the apex perfect, from Izumo and Omi, but as there are very few specimens, I do not feel sure that it is distinct from *B. simplex;* especially since a snail which seems to be not specifically distinct from *simplex* has been sent by Mr. Y. Hirase from Kajima, Satsuma (his no. 406).

Erosion of the early whorls in fresh-water gastropods seems to be consequent upon extensive parasitization of the liver. It may be that on breaking down of the peripheral (terminal) cells

by the Distomata, etc., shell-material is deposited there, and the filled-up distal end of the shell becomes dead and liable to abrasion by mechanical, chemical or organic external agencies.

Blanfordia has been associated with the *Truncatellidæ* by Fischer and Tryon. The first one I saw was referred to the genus *Pomatiopsis* (*Amnicolidæ*), on account of the dentition, which I described in NAUTILUS for May, 1900, p. 12. Two years later I recognized that my species was a *Blanfordia* (*cf.* Proc. A. N. S. Phila., 1902, pp. 26, 27); and I retained the



FIGS. 1, 1*a*, BLANFORDIA JAPONICA. 2, 2*a*, B. NOSOPHORA.
3, 3*a*, B. SIMPLEX. 4. B. BENSONI.

genus distinct from *Pomatiopsis* because of small differences in the animal as described by Dr. Arthur Adams. The dentition is, however, that of *Pomatiopsis*, which is rather characteristic from the small number of denticles on the two outer teeth—nearly all other *Amnicolidæ* having very numerous denticles on these teeth. My removal of *Blanfordia* from the *Truncatellidæ* and its approximation to *Pomatiopsis* was, I believe, justified.

The type of *Blanfordia* is *B. japonica.* If the genus be thought identical with *Pomatiopsis*, the name may be retained for the varicose species, in a subgeneric sense.

P. S.—Since the above was written, I have received (April 16) a paper "Observations on the Spread of Asiatic Schistosomatosis," by Dr. R. T. Leiper and Surgeon E. K. Atkinson,

R. N., in the *British Medical Journal*, Jan. 30, 1915, dealing with *Schistosoma*, and having as an appendix a note by Mr. G. C. Robson describing the mollusk which serves as host for its cercariæ. This mollusk is called *Katayama nosophora* n. g. et sp. It is undoubtedly identical with the form sent me by Professor Goto, and described above. As I have already had the figures for my article engraved, I allow it to stand as written, merely substituting Mr. Robson's specific name for my own. It may be useful to point out that the mollusk in question belongs to the long-known genus *Blanfordia*, and that the new genus *Katayama* is therefore superfluous. Mr. Robson was naturally misled by the wrong position assigned *Blanfordia* by the older authorities.

SOME EXCEPTIONAL CASES OF BREEDING AMONG THE UNIONIDÆ.[1]

BY ARTHUR D. HOWARD.

In collecting material for the study of a somewhat peculiar case of breeding among the Unionidæ, I have incidentally come upon some other instances, which I believe have not been reported. In 1912 I undertook to work out for the United States Bureau of Fisheries, methods of propagation of the Washboard mussel, *Quadrula heros* Say, with other species of Quadrula. This species was somewhat uncommon in the vicinity of the laboratory where I was stationed, so that there was a question as to a supply of material. One day I noticed a boatload of shells containing an unusual number of *Q. heros* with many young shells. Enquiring of the owner the source of these, I learned they had come from Moline, Ill., some 25 miles above. I subsequently visited the place, finding it accessible and the species sufficiently abundant to furnish considerable data on breeding as well as material for experiments in propagation.

While collecting the Washboard mussel at this point I obtained evidence of peculiarities in the breeding of three other Unionidæ which, although they may not be of immediate im-

[1] Contribution from United States Biological Station, Fairport, Iowa. Published by permission of Commissioner of Fisheries.